

CLAIM AMENDMENTS

The following listing of the claims replaces all prior versions, and listings, of the claims in the application.

1-37. (Cancelled)

38. (Currently Amended) A method of forming a capacitor, comprising:

forming a recess in a substrate assembly, wherein the recess extends to a first surface of an interconnect embedded within the substrate assembly;

forming a non-smooth mold in the recess and on the first surface of the interconnect;

removing a portion of the non-smooth mold from the first surface of the interconnect;

forming a first electrode in [[a]] the recess of [[a]] the substrate assembly on the non-smooth mold and the first surface of the interconnect, wherein the first electrode is [[and]] selected from a group consisting of transition metals, conductive metal-oxides, alloys thereof, and combinations thereof, and wherein the first electrode extends above an uppermost surface of the substrate assembly;

forming a dielectric on the first electrode and the uppermost surface of the substrate assembly;

heating the dielectric in the presence of an oxygen-containing ambient; and

forming a second electrode on the dielectric and the uppermost surface of the substrate assembly, wherein the first and second electrodes each include a non-smooth surface.

39. (Original) The method of claim 38, wherein forming the first electrode includes performing chemical vapor deposition.

40. (Original) The method of claim 38, wherein forming the first electrode includes

planarization after performing chemical vapor deposition.

41. (Original) The method of claim 38, wherein forming the first electrode from transition metals includes forming the first electrode from a group consisting of Pt, Rh, Ir, Ru, and Pd.

42. (Original) The method claim 38, wherein forming the first electrode from a conductive metal-oxide includes forming the first electrode from a group consisting of IrO_x , RuO_x and RhO_x and wherein $x < 4$.

43. (Original) The method of claim 38, wherein forming the first electrode includes forming the first electrode selected from the group consisting of Pt, Rh, Ir, Ru, Pd, IrO_x , RuO_x , RhO_x , wherein $x < 4$, alloys thereof, and combinations thereof.

44. (Cancelled)

45. (Original) The method of claim 38, wherein forming the second electrode includes forming the second electrode from a group consisting of transition metals, conductive metal-oxides, aluminum, TiN, TaN, polysilicon, W, and WN.

46. (Original) The method of claim 38, wherein forming the second electrode includes forming the second electrode by chemical vapor deposition.

47. (Previously Presented) The method of claim 38, wherein forming the dielectric includes forming the dielectric from an insulating metal oxide.

48. (Original) The method of claim 47, wherein forming the dielectric includes forming a material selected from the group consisting of barium strontium titanate, Ta_2O_5 , $SrTiO_3$, $Sr_wBi_xTa_yO_z$, and $Ba_xSr_{1-x}TiO_3$ where $0 < x < 1$.

49. (Previously Presented) The method of claim 38, further comprising forming the substrate assembly before forming the first electrode.

50. (Cancelled)

51. (Cancelled)

52. (Currently Amended) A method of forming a capacitor, comprising:
forming a recess in a substrate assembly, wherein the recess extends to a first surface of an interconnect embedded within the substrate assembly;
forming a layer of hemispherical grain polysilicon in [[a]] the recess of [[a]] the substrate assembly and on the first surface of the interconnect;
removing a portion of the layer of hemispherical grain polysilicon from the first surface of the interconnect;
forming a first electrode on the hemispherical grain polysilicon and the first surface of the interconnect, wherein the first electrode is selected from a group consisting of transition metals, conductive metal-oxides, alloys thereof, and combinations thereof, and wherein the first electrode extends above an uppermost surface of the substrate assembly;
forming a dielectric on the first electrode and the uppermost surface of the substrate assembly;
heating the dielectric in the presence of an oxygen-containing ambient; and

forming a second electrode on the dielectric and the uppermost surface of the substrate assembly, wherein the first and second electrodes each include a non-smooth surface.

53. (Original) The method of claim 52, further comprising planarizing after forming the first electrode.

54. (Original) The method of claim 52, wherein planarizing includes performing mechanical abrasion.

55. (Original) The method of claim 54, wherein performing mechanical abrasion includes performing chemical mechanical planarization.

56. (Currently Amended) The method of claim 52, further comprising removing a remainder of the hemispherical grain polysilicon.

57. (Previously Presented) The method of claim 52, further comprising forming the substrate assembly before forming the first electrode.

58. (Currently Amended) A method, comprising:
forming a substrate assembly;
forming a recess in the substrate assembly, wherein the recess extends to a first surface of an interconnect embedded within the substrate assembly;

forming a layer of hemispherical grain polysilicon in [[a]] the recess of the substrate assembly and on the first surface of the interconnect;

removing a portion of the hemispherical grain polysilicon from the first surface of the

interconnect;

forming a first electrode on the hemispherical grain polysilicon and the first surface of the interconnect, wherein the first electrode is selected from a group consisting of transition metals, conductive metal-oxides, alloys thereof, and combinations thereof, and wherein the first electrode extends above an uppermost surface of the substrate assembly;

removing a portion of the substrate assembly;

removing the hemispherical grain polysilicon;

forming a dielectric on the first electrode and the uppermost surface of the substrate assembly;

heating the dielectric in the presence of an oxygen-containing ambient; and

forming a second electrode on the dielectric and the uppermost surface of the substrate assembly, wherein the first and second electrodes each include a non-smooth surface.

59. (Cancelled)

60. (Original) The method of claim 58, further comprising forming a contact in the substrate assembly, and wherein forming the first electrode includes forming the first electrode in the contact.

61-80. (Cancelled)